

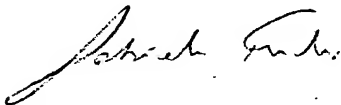
Docket No.: 4883/PCT
Inv.: Hermann PIRNER et al.

10/540000
JC09 Rec'd PCT/PTO 17 JUN 2005
USPS EXPRESS MAIL
EV 636 851 417 US
JUNE 17 2005

Verification of Translation

I, Gabriele Fuchs, residing at Martin-Albert-Str. 4, 90491 Nuremberg, Federal Republic of Germany, hereby declare that I am conversant with the English and German languages and that I am a competent translator thereof. I declare further that, to the best of my knowledge and belief, the foregoing is a true, faithful, complete and accurate translation of PCT International Application PCT/DE2003/003326 as filed on October 8, 2003 in the name of Conti Temic microelectronic GmbH, the original of which application has been submitted to me in the German language.

Nuremberg, April 28, 2005



Gabriele Fuchs

1/10/07

JCO9 Rec'd PCT/PTO 10/540000
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Description

Electromechanical sub-assembly

5 The invention relates to an electromechanical sub-assembly of electronic and mechanical components according to the preamble of patent claim 1.

10 Sub-assemblies, which are produced and distributed as intermediates, as a rule are equipped with customized specific features. In case of sub-assemblies with electronic components these are e.g. the electrical connection device of the electronic component, via which the electronic
15 component is connected by means of a customized connection element for instance to a power supply or to a control device assigned to the electronic sub-assembly.

In this case adaptation of the sub-assembly to the
20 customized features in its production results in that several housings differing for instance in said electrical connection devices, must be produced for receiving the electronic component. Thus, the number of the housings to be produced identically is reduced, whereby the production costs for the sub-assembly highly increase.

25 It is the object of the invention to indicate an electromechanical sub-assembly, in which the housing is embodied to be compatible to different housing variants in terms of its internal and external contact terminals and
30 which even though can be produced at low costs. Moreover, the components and partial components pertaining to the electromechanical sub-assembly should to be combinable as compact as possible.

This object can be achieved in accordance with the invention by an electromechanical sub-assembly with the features of patent claim 1.

5

Accordingly, an electromechanical sub-assembly is provided with a control module equipped with first contacts, a mechanical module with second contacts, a support module for fixing the control module and the mechanical module, the support module comprising first terminals for contacting the first contacts, second terminals for contacting the second contacts and at least one connection device for contacting the electromechanical sub-assembly.

15

The electromechanical sub-assembly embodied in this way can be produced at low costs, as the support module forming the housing can be simply produced with different terminals. Here, the control module, the mechanical module and the support module are combined in compact manner, whereby for example maintenance works can be easily performed.

Advantageous embodiments and further improvements can be taken from the sub-claims and the description taken in conjunction with the drawing.

25

In a further embodiment of the invention it is provided that the support module forms a body, into which pressed screens are incorporated. These pressed screens form the electrical connections within the electromechanical sub-assembly, i.e. between the at least one connection device, the first terminals and the second terminals. Here, the support module is manufactured of an electrically non-conductive material.

35

In a further improvement of the invention it is provided that the electromechanical sub-assembly composed of the control module, the mechanical module and the support module comprises an approximately cuboidal structural shape. In the
5 corners of the electromechanical sub-assembly four recesses for joining elements, e.g. screws, are placed. Two of the recesses are embodied as a screwing hole for interconnecting the control module, the mechanical module and the support
10 module. The other two recesses are embodied as a fixing hole for fixing the electromechanical sub-assembly for example to a truck.

The control module consists of a thermal conductive metal,
15 onto which a circuit arrangement comprising the first contacts is mounted.

The control module is embodied such that it forms the lid of the electromechanical sub-assembly.
20

In a further improvement of the invention it is provided that in the mechanical module actors and sensors are arranged, which form a closed loop.

25 The electronic control of the closed loop is advantageously arranged in the circuit arrangement of the control module.

In a further improvement of the invention it is provided
30 that the control module, the mechanical module and the support module in their assembled state form a housing which is waterproof towards periphery.

In a typical embodiment of the invention at least one of the
35 connection devices forms an external terminal of the

electromechanical sub-assembly.

In a typical embodiment of the invention the terminals and contacts respectively form a terminal block or a contact
5 block, wherein a respective contact block can be assembled with the terminal block associated to it in accordance with the key-lock-principle.

10 The invention is explained in detail in the following taken in conjunction with the examples of embodiment indicated in the figures of the drawing.

Fig. 1 shows a view of the composed electromechanical sub-
15 assembly comprising the control module, the mechanical module and the support module, and

Fig. 2 shows a view of the individual electromechanical sub-
assembly comprising the control module, the mechanical
20 module and the support module.

In all figures of the drawing like or function-like elements and parts- as far as not noted otherwise - refer to
25 identical reference numerals.

In Fig. 1 the completely assembled electromechanical sub-
assembly 1 is shown, which comprises a control module 2, a
support module 4 and a mechanical module 3. The
30 electromechanical sub-assembly 1 serves for controlling the pressure of a pneumatic facility of a truck.

With this embodiment in the mechanical module 4 made of cast aluminum sensors are contained, which measure the pneumatic
35 pressure in the facility. Moreover, an actor 6 is contained

in the mechanical module, which is embodied as a valve, which allows the compressed air to deflate.

5 At the support module 3 a connection device 3.3 is embodied, via which all electronic components of the electromechanical sub-assembly are connected to a power supply, and via which the electromechanical sub-assembly is connected to further electrical components of the truck, i.e. a compressor. The support module was manufactured by plastics spraying method
10 which is electrically non-conductive. The connection device 3.3 is embodied in accordance with the specifications of the truck manufacturer.

15 In Fig. 2 the components of the electromechanical sub-assembly are shown. The control module 2, the support module 3 and the mechanical module 4 are interconnected by screws 8, which are formed at two opposite corners of the electromechanical sub-assembly which is substantially
20 rectangular. For this purpose two screwing holes 9.1 of a smaller diameter are placed in the electromechanical sub-assembly, preferably threads for the screws 9 being placed in the mechanical module. The two remaining corners of the electromechanical sub-assembly comprise fixing holes 9.2
25 with a larger diameter, which serve for fixing the electromechanical sub-assembly to the truck.

The control module 2 consists substantially of an aluminum
30 plate, onto which a circuit arrangement 2.2 is arranged on a printed circuit board or a ceramic body 2.3. This circuit has been mounted for example in SMD technology on a printed circuit board basis or in hybrid technology. The circuit arrangement 2.2 comprises the closed loop of the pneumatic
35 facility, for example a proportional closed loop. Within

this closed loop the actual value of the pneumatic pressure determined by the sensor 5 is compared with a nominal value which is dependent e.g. from the operating state of the truck. In case the nominal value is exceeded, for instance
5 the actor 6 formed as a drain valve is opened, in case of falling below the nominal value the compressor of the truck is activated.

10 The circuit arrangement 2.1 of the control module 2 mounted on the ceramic body 2.3 comprises a first contact block 2.1, via which the circuit arrangement 2.1 is connected to ground, voltage and signal lines.

15 At the mechanical module 4 a second contact block 4.1 is formed, via which the actors 6 and sensors 5 are connected to ground, voltage and signal lines.

When installing the electromechanical sub-assembly the first
20 contact block 2.1 of the control module 2 is connected to the first terminal block 3.1 of the support module 3. Likewise the second contact block 4.1 of the mechanical module 4 is connected to a second terminal block 3.2 of the support module. The first terminal block 3.1 and the second
25 terminal block 3.2 are connected to a pressed screen 3.4 cast into the support module 3, which forms the contacts of a connection device 3.3. The connection device 3.3 is formed in accordance with the specifications of the truck
30 manufacturer, wherein a plug-in device can be pushed onto the connection device 3.3.

For sealing the electromechanical sub-assembly (1) against penetration of water for example in the support module (3)
35 on the sides facing the control module (2) and the

mechanical module (4) one circumferential groove each can be formed, into which an o-ring is inserted.

5 The possibility that only the support module 3 is to be adapted to the customer's need allows that the electromechanical sub-assembly can be produced at low costs. By the modular construction, which can be dismounted in easy manner, maintenance works at the electromechanical sub-assembly can be simply performed.
10

In summary, one can say that by means of the electronic sub-assembly embodied as described, a very high degree of compatibility with the most different sub-assembly variants
15 can be achieved in very simple, but nevertheless very effective manner, without having to renounce on the possibility of a cost-efficient and simple production.

The present invention has been presented based on the above
20 description such that the principle of the invention and its practical application is explained best possible, however, as a matter of course the invention can be realized in diverse other forms of embodiment if modified appropriately.

25

List of reference numerals

- 1 Electromechanical sub-assembly
- 2 Control module
- 5 2.1 First contact block
- 2.2 Circuit arrangement
- 2.3 Ceramic body, printed circuit board
- 3 Support module
- 10 3.1 First terminal block
- 3.2 Second terminal block
- 3.3 Connection device
- 3.4 Pressed screen
- 15 4 Mechanical module
- 4.1 Second contact block
- 5 Sensors
- 20 6 Actors
- 7 Pneumatic terminal
- 8 Screws
- 25 9.1 Screwing hole
- 9.2 Fixing hole